

IN THE CLAIMS

1. - 14. (Cancelled)

15. (Previously presented) A coupling according to claim 37, wherein the ring halves, besides said bolting means for fixing their extremities in one place comprise pivoting means for fixing them in their opposite extremities.

16. (Previously presented) A coupling according to claim 42, wherein the first end portion comprises a tubular insert coupled between a tubular section and said second end portion, and wherein the insert end facing the tubular section is a ring which can slide axially over said tubular section whereas the opposite insert end is a ring over which said second end portion can slide.

17. (Previously presented) A coupling according to claim 45, wherein the length of the overlap portion between the first and second tube portions is 50% or less of the inner diameter of the first portion.

18. (Previously presented) A coupling according to claim 45, wherein the length of the overlap portion between the first and second end portions is 5% or more of the inner diameter of the first portion.

19. (Previously presented) A coupling according to claim 45, wherein the coupling is an high vacuum or ultra-high vacuum coupling, and includes a second sealing ring located between the first tubular section and the abutment ring.

20. (Cancelled)

21. (Cancelled)

22. (Previously presented) A coupling for a cylindrical sputtering target according to claim 38, wherein the ring halves, besides said bolting means for fixing their extremities in one place comprise pivoting means for fixing them in their opposite extremities.

23. (Cancelled)

24. (Previously presented) A coupling for a cylindrical sputtering target according to claim 42, wherein the length of the overlap portion between the first and second tube portions is 50% or less of the inner diameter of the first portion.

25. (Previously presented) A coupling according to claim 42, wherein the length of the overlap portion between the first and second end portions is 5% or more of the inner diameter of the first portion.

26. (Previously presented) A coupling for a cylindrical sputtering target according to claim 42, wherein the coupling is an high vacuum or ultra-high vacuum coupling.

27. (Previously presented) The coupling for a cylindrical sputtering target according to claim 42, wherein the fixing means of the clamping ring is located on the side of the coupling remote from the sputtering target.

28. (Previously presented) The coupling for a cylindrical sputtering target according to claim 42, further comprising an anti-arcing element.

29. (Previously presented) The coupling for a cylindrical sputtering target according to claim 28, the anti-arcing element being attached to a surface of the clamping ring on the same side as the sputtering target for preventing arcing.

30. (Previously presented) The coupling for a cylindrical sputtering target according to claim 28, wherein the anti-arcing element is conductive or insulating.
31. (Previously presented) The coupling for a cylindrical sputtering target according to claim 28, wherein at least one groove is provided between the anti-arcing element and the clamping ring .
32. (Previously presented) The coupling for a cylindrical sputtering target according to claim 28, wherein the arcing element touches a surface of the sputtering target.
33. (Previously presented) A coupling according to claim 45, wherein the length of the overlap portion between the first and second tube portions is 30% or less of the inner diameter of the first portion.
34. (Previously presented) A coupling according to claim 45, wherein the length of the overlap portion between the first and second tube portions is 20% or less of the inner diameter of the first portion.
35. (Previously presented) A coupling for a cylindrical sputtering target according to claim 42, wherein the length of the overlap portion between the first and second tube portions is 30% or less of the inner diameter of the first portion.
36. (Previously presented) A coupling for a cylindrical sputtering target according to claim 42, wherein the length of the overlap portion between the first and second tube portions is 20% or less of the inner diameter of the first portion.
37. (Previously presented) A coupling according to claim 45, wherein the clamp elements are two substantially equal ring halves.

38. (Previously presented) A coupling for a cylindrical sputtering target according to claim 42, wherein the clamp elements are two substantially equal ring halves.

39. (Previously presented) A coupling according to claim 42, wherein the length of the overlap portion between the first and second tube portions is at least 5% of the inner diameter of the first portion.

40. (Previously presented) A coupling according to claim 45, wherein the length of the overlap portion between the first and second tube portions is at least 5% of the inner diameter of the first portion.

41. (Cancelled)

42. (Currently amended) A vacuum tight coupling for a cylindrical sputtering target for end portions of two tubular sections, each tubular section having an inner diameter and an outer diameter, the outer diameter of the first tubular section being smaller than the inner diameter of the second tubular section, the second tubular section axially slidable over the first tubular section to abut against a peripheral outer abutment ring on said first tubular section, the coupling further including at least one sealing ring located between the outer diameter of the first tubular section and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular sections, the outer diameter of the first tubular section is generally parallel to the opposing surface of the inner wall of the second tubular section from the sealing ring to the end of the first tubular section, the coupling further comprising a clamping ring with a substantially cylindrical outer surface and being composed of clamping elements, each clamp element having a semi-circular or U-shaped cross section with an inwardly oriented recess, said recess enclosing said abutment ring and a flange extremity on the second tubular section, said flange extremity is a separate ring, said recess cooperating with the flange extremity to positively, solidly and axially clamp the abutment ring against the flange extremity,

the clamp elements being fixed to each other at their extremities with fixing means comprising in at least one place on the clamping ring bolting means, the axis of which is perpendicular to the longitudinal axis of the coupled tubular sections and substantially tangential to the clamping ring periphery, the coupling further including a second sealing ring located between the outer diameter of the first tubular section and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular sections.

43. (Cancelled)

44. (Currently amended) A vacuum tight coupling for end portions of two tubular sections having end portions, the end portion of the first tubular section being a flange extending in a radial direction from the first tubular section, the flange being of a diameter not exceeding the maximum diameter of the second tubular section, the second tube end portion being slidable over the end portion of the first tubular section creating an area of overlap, at least one sealing ring located in the area of overlap, the outer diameter of the first tubular section is generally parallel to the opposing surface of the inner wall of the second tubular section from the sealing ring to the end of the first tubular section, the end portion of the first tubular section further including an abutment ring about the outer periphery, the end portion of the second tubular section being provided with a flange extremity being a separate ring, the coupling further including a clamping ring with a substantially cylindrical outer surface and being composed of clamping elements, each clamp element having a semi-circular or U-shaped cross section with an inwardly oriented recess, said recess enclosing said abutment ring and a flange extremity on the second tubular section, said recess cooperating with the flange extremity to positively, solidly and axially clamp the abutment ring against the flange extremity, the clamp elements being fixed to each other at their extremities with fixing means comprising in at least one place on the clamping ring bolting means, the axis of which is perpendicular to the longitudinal axis of the coupled tubular sections and substantially tangential to the clamping ring

periphery, the coupling further including a second sealing ring located between the outer diameter of the first tubular section and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular sections.

45. (previously presented) A vacuum tight coupling for end portions of two tubular sections, the first tubular section being a spindle, the second tubular section being a target, the end portion of the second tubular section having an inner tubular wall and the end portion of the first tubular section having an outer tubular wall, said inner wall of said second tubular section being slidable over said outer wall end portion of the first tubular section creating an area of overlap, at least one sealing ring located in the area of overlap between said inner tubular wall and said outer tubular wall, the end portion of the first tubular section further including an abutment ring about the outer periphery the end portion of the second tubular section being provided with a flange extremity being a separate ring, the coupling further including a clamping ring with a substantially cylindrical outer surface and being composed of clamping elements, each clamp element having a semi-circular or U-shaped cross section with an inwardly oriented recess, said recess enclosing said abutment ring and a flange extremity on the second tubular section, the flange extremity being a separate ring, said recess cooperating with the flange extremity to positively, solidly and axially clamp the abutment ring against the flange extremity while exercising a uniform and radial pressure on said at least one sealing ring, the clamp elements being fixed to each other at their extremities with fixing means comprising in at least one place on the clamping ring bolting means, the axis of which is perpendicular to the longitudinal axis of the coupled tubular sections and substantially tangential to the clamping ring periphery.

46. (new) A coupling according to claim 45, wherein the coupling further including a second sealing ring located between the outer diameter of the first tubular section

and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular section.

47. (new) A coupling according to claim 46, wherein the second sealing ring is located between the first tubular section and the abutment ring.

48. (new) A vacuum tight coupling for a cylindrical sputtering target according to claim 42, wherein the second sealing ring is located between the first tubular section and the abutment ring.

49. (new) A vacuum tight coupling according to claim 44, wherein the second sealing ring is located between the first tubular section and the abutment ring.

50. (new) A coupling according to claim 45, wherein the first end position comprises a tubular insert coupled between a tubular section and said second end portion, and wherein the insert end facing the tubular section is a ring which can slide axially over said tubular section whereas the opposite insert end is a ring over which said second end portion can slide.

51. (new) A coupling according to claim 45, wherein the coupling is an high vacuum or ultra-high vacuum coupling.

52. (new) A coupling according to claim 45, wherein the fixing means of the clamping ring is located on the side of the coupling remote from the sputtering target.

53. (new) A coupling according to claim 45, further comprising an anti-arc element.

54. (new) A coupling according to claim 53, wherein the anti-arc element being attached to a surface of the clamping ring on the same side as the sputtering target for preventing arcing.

55. (new) A coupling according to claim 53, wherein the anti-arcing element is conductive or insulating.
56. (new) A coupling according to claim 53, wherein at least one groove is provided between the anti-arcing element and the clamping ring .
57. (new) A coupling according to claim 53, wherein the arcing element touches a surface of the sputtering target.
58. (new) A coupling according to claim 44, wherein the clamp elements are two substantially equal ring halves.
59. (new) A coupling according to claim 58, wherein the ring halves, besides said bolting means for fixing their extremities in one place comprise pivoting means for fixing them in their opposite extremities.
60. (new) A coupling according to claim 44, wherein the length of the overlap portion between the first and second tube portions is 50% or less of the inner diameter of the first portion.
61. (new) A coupling according to claim 44, wherein the length of the overlap portion between the first and second end portions is 5% or more of the inner diameter of the first portion.
62. (new) A coupling according to claim 44, wherein the first end position comprises a tubular insert coupled between a tubular section and said second end portion, and wherein the insert end facing the tubular section is a ring which can slide axially over said tubular section whereas the opposite insert end is a ring over which said second end portion can slide.

63. (new) A coupling according to claim 44, wherein the length of the overlap portion between the first and second tube portions is 30% or less of the inner diameter of the first portion.

64. (new) A coupling according to claim 44, wherein the length of the overlap portion between the first and second tube portions is 20% or less of the inner diameter of the first portion.

65. (new) A coupling according to claim 44, wherein the length of the overlap portion between the first and second tube portions is at least 5% of the inner diameter of the first portion.

66. (new) A coupling according to claim 44, wherein the coupling is an high vacuum or ultra-high vacuum coupling.

67. (new) A coupling according to claim 44, wherein the fixing means of the clamping ring is located on the side of the coupling remote from the sputtering target.

68. (New) A vacuum tight coupling for a cylindrical sputtering target for end portions of two tubular sections, each tubular section having an inner diameter and an outer diameter, the outer diameter of the first tubular section being smaller than the inner diameter of the second tubular section, the second tubular section axially slidable over the first tubular section to abut against a peripheral outer abutment ring on said first tubular section, the coupling further including at least one sealing ring located between the outer diameter of the first tubular section and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular sections, the outer diameter of the first tubular section is generally parallel to the opposing surface of the inner wall of the second tubular section from the sealing ring to the end of the first tubular section, the coupling further comprising a clamping ring with a substantially cylindrical outer surface and being composed of clamping

elements, each clamp element having a semi-circular or U-shaped cross section with an inwardly oriented recess, said recess enclosing said abutment ring and a flange extremity on the second tubular section, said recess cooperating with the flange extremity to positively, solidly and axially clamp the abutment ring against the flange extremity, the clamp elements being fixed to each other at their extremities with fixing means comprising in at least one place on the clamping ring bolting means, the axis of which is perpendicular to the longitudinal axis of the coupled tubular sections and substantially tangential to the clamping ring periphery, the coupling further including a second sealing ring located between the outer diameter of the first tubular section and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular sections.

69. (new) A vacuum tight coupling for end portions of two tubular sections having end portions, the end portion of the first tubular section being a flange extending in a radial direction from the first tubular section, the flange being of a diameter not exceeding the maximum diameter of the second tubular section, the second tube end portion being slidable over the end portion of the first tubular section creating an area of overlap, at least one sealing ring located in the area of overlap, the outer diameter of the first tubular section is generally parallel to the opposing surface of the inner wall of the second tubular section from the sealing ring to the end of the first tubular section, the end portion of the first tubular section further including an abutment ring about the outer periphery, the end portion of the second tubular section being provided with a flange extremity, the coupling further including a clamping ring with a substantially cylindrical outer surface and being composed of clamping elements, each clamp element having a semi-circular or U-shaped cross section with an inwardly oriented recess, said recess enclosing said abutment ring and a flange extremity on the second tubular section, said recess cooperating with the flange extremity to positively, solidly and axially clamp the abutment ring against the flange extremity, the clamp elements being fixed to each other at their extremities with fixing means comprising in at least one place on the clamping ring bolting means, the axis of which is perpendicular to the

longitudinal axis of the coupled tubular sections and substantially tangential to the clamping ring periphery, the coupling further including a second sealing ring located between the outer diameter of the first tubular section and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular sections.

70. (new) A vacuum tight coupling for end portions of two tubular sections, the first tubular section being a spindle, the second tubular section being a target, the end portion of the second tubular section having an inner tubular wall and the end portion of the first tubular section having an outer tubular wall, said inner wall of said second tubular section being slidable over said outer wall end portion of the first tubular section creating an area of overlap, at least one sealing ring located in the area of overlap between said inner tubular wall and said outer tubular wall, the end portion of the first tubular section further including an abutment ring about the outer periphery the end portion of the second tubular section being provided with a flange extremity, the coupling further including a clamping ring with a substantially cylindrical outer surface and being composed of clamping elements, each clamp element having a semi-circular or U-shaped cross section with an inwardly oriented recess, said recess enclosing said abutment ring and a flange extremity on the second tubular section, said recess cooperating with the flange extremity to positively, solidly and axially clamp the abutment ring against the flange extremity while exercising a uniform and radial pressure on said at least one sealing ring, the clamp elements being fixed to each other at their extremities with fixing means comprising in at least one place on the clamping ring bolting means, the axis of which is perpendicular to the longitudinal axis of the coupled tubular sections and substantially tangential to the clamping ring periphery.

71. (new) A coupling according to claim 70, wherein the coupling further including a second sealing ring located between the outer diameter of the first tubular section

and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular section.

72. (new) A vacuum sputter reactor comprising a rotatable vacuum tight coupling suitable for rotation within a small opening of said reactor, said coupling comprising

- a first tubular section in the form of a spindle,
- a second tubular section in the form of a cylindrical target,

each tubular section having an inner diameter and an outer diameter, the outer diameter of the first tubular section being smaller than the inner diameter of the second tubular section,

the second tubular section axially slidable over the first tubular section to abut against a peripheral outer abutment ring on said first tubular section, the coupling further comprising at least one sealing ring located between the outer diameter of the first tubular section and the inner diameter of the second tubular section in a sliding overlapping contact area of the first and second tubular sections, the outer diameter of the first tubular section is generally parallel to the opposing surface of the inner wall of the second tubular section from the sealing ring to the end of the first tubular section, the coupling further comprising a clamping ring with a substantially cylindrical outer surface in order to place cylindrical shields closely to the clamping ring, said clamping ring being composed of clamping elements, each clamp element having a semi-circular or U-shaped cross-section with an inwardly oriented recess, said recess enclosing said abutment ring and a flange extremity on the second tubular section, said recess cooperating with the flange extremity to positively, solidly and axially clamp the abutment ring against the flange extremity, the clamp elements being fixed to each other at their extremities with fixing means comprising in at least one place on the clamping ring bolting means, the axis of which is perpendicular to the longitudinal axis of the coupled tubular sections and substantially tangential to the clamping ring periphery.

73. (new) A reactor according to claim 72, wherein said first tubular section carries said second tubular section.

74. (new) A reactor according to claim 72, wherein said overlapping contact area is at least 5% of the inner diameter of the first tubular section in order to give robustness to said coupling.

75. (new) A reactor according to claim 72, wherein said clamping ring has a surface with an anti-arcing element to avoid arcing during sputtering.

76. (new) A reactor according to claim 75, wherein said anti-arcing element is conductive or insulating.

77. (new) A reactor according to claim 72 wherein the clamp elements are two substantially equal ring halves.

78. (new) A reactor according to claim 72, wherein said fixing means of the clamping ring is located on the side remote from the second tubular section in order to avoid or reduce sputtering of target material onto the fixing means.

79. (new) A reactor according to claim 72, said coupling allowing sputtering at a pressure down to about 10^{-9} bar, wherein said at least one sealing ring being a rubber O-ring.

80. (new) A reactor according to claim 72, said coupling allowing sputtering at a pressure between 10^{-15} and 10^{-11} bar, wherein said at least one sealing ring being a toroidal flexible.